

Notice of Allowability

Application N .

10/694,171

Examiner

Rip A. Lee

Applicant(s)

NAKAO, HAJIME

Art Unit

1713

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to June 1, 2006.
2. ☒ The allowed claim(s) is/are 1-6 and 8-13.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

The application has been amended as follows:

Claim 1, line 4 replace "a radiation" with "actinic radiation"

Allowable Subject Matter

The following is an examiner's statement of reasons for allowance: Claims 1-6 and 8-13 are allowed over the closest references cited below.

The present invention is drawn to a composition comprising: (A) a resin having a mono/polycyclic alicyclic hydrocarbon structure which increases its solubility in an alkali developing solution by the action of an acid, (B) a compound capable of generating an acid upon irradiation with an actinic ray or radiation, and (C) an alkoxy alcohol as solvent, wherein an alkoxy group and an alcoholic hydroxyl group are connected to each other *via* at least three carbons, wherein resin (A) comprises a repeating unit having an alkali-soluble group protected by a 2-alkyl-2-adamantyl group or a 1-adamantyl-1-alkylalkyl group.

Harada *et al.* (U.S. 6,511,787) discloses teaches a positive resist composition comprising polymers C and H, both of which have a 2-alkyl-2-adamantyl protecting group, and said resist composition is cast from a solution using propylene glycol monomethyl ether acetate, PGMEA as the solvent. The inventors indicate that a wide variety of solvent may be used for making resist compositions provided that both photoacid generator and decomposing resin are soluble in the solvent. Use of 3-alkoxy-1-alcohols such as 3-methoxy-1-butanol and 3-methyl-3-methoxybutan-1-ol is contemplated, and it was established that it would have been obvious to one having ordinary skill in the art to use these alkoxy alcohols in place of PGMEA.

Applicants have shown unexpected results over the cited example. The composition of inventive example 1 contains essentially the same resin as that cited in Harada *et al.* (polymer C), however, the solvent is the claimed 3-methoxybutanol. Comparative example 1 contains polymer C in PGMEA. The inventive example exhibits a significantly reduced change in sensitivity (expressed in terms of an exposure amount capable of reproducing a 0.15 μm line and space (1/1) pattern) compared with the comparative example. Comparative example 2 comprises polymer C and a combination of propylene glycol monomethyl ether (a 2-alkoxy-1-alcohol) and PGMEA, a solvent combination that is typically used with such decomposable resins. This composition also exhibits a fairly large change in sensitivity. These results are unexpected and

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not obvious over the teachings of Harada *et al.* Applicants have also shown in inventive examples 2-12 that resist compositions derived from the combination of resin containing 2-alkyl-2-adamantyl or 1-adamantyl-1-alkylakyl protecting groups with 3-alkoxy-1-alcohol exhibit small changes in sensitivity. Given the diversity of polymers used in the examples, it is concluded that the unexpected results are commensurate in scope with the subject matter recited in the claims. Therefore, the present invention is deemed unobvious, and hence, patentable, over Harada *et al.*

Nishi *et al.* (U.S. 6,673,518) disclose resist compositions comprising a resin containing a repeating unit having an alkali-soluble group protected by a 2-alkyl-2-adamantyl group or a 1-adamantyl-1-alkylakyl group, and said resist composition is cast from a solution using propylene glycol monomethyl ether acetate, PGMEA as the solvent (examples 1 and 6, respectively). The inventors contemplate a wide variety of solvent, with mention of 3-methoxy-1-butanol and 3-methyl-3-methoxy-butan-1-ol. Based on the showing of unexpected results in the present application, which is sufficiently commensurate in scope with the subject matter (see previous paragraph), it is also concluded that the present invention is also patentable over Nishi *et al.*

Fujimori *et al.* (U.S. 6,692,897), Sato *et al.* (U.S. 6,479,211), and Nishi *et al.* (U.S. 6,673,518) disclose resist compositions comprising a resin containing a repeating unit having a 2-alkyl-2-adamantyl group or a 1-adamantyl-1-alkylakyl group. The references do not teach use of an alkoxy alcohol as solvent in which the alkoxy group and hydroxyl group are connected to each other *via* at least three carbons.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

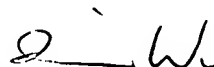
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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rip A. Lee whose telephone number is (571)272-1104. The examiner can be reached on Monday through Friday from 9:00 AM - 5:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached at (571)272-1114. The fax phone number for the organization where this application or proceeding is assigned is (571)273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <<http://pair-direct.uspto.gov>>. Should you have questions on the access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll free).

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January 26, 2006



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